REMARKS

Claims 1-5 are pending and stand ready for further action on the merits. Claims 2-5 have been amended to more clearly define the layers using the identifiers "A", "B" and "C". Support for claim 5 can be found in claim 2. No new matter has been added by way of the above-amendment.

The following sections correspond to the sections in the outstanding Office Action.

Sections 3-4

The Examiner objects to claim 2 for reciting a "second layer" initially in line 2 and then in line 4 "a first layer". In addition, the Examiner objects to claim 5 for reciting a "second" and "third" layer without referring to a "first" layer.

In response, Applicants have amended claims 2-5 by replacing the terms "first", "second", and "third" [illegible] "A", "B" and "C". Accordingly, the Applicants submit that the objection to claim 5 [illegible] "A", "B" and "C" [illegible]

[illegible] the semiconductor structure [illegible] necessarily limited [illegible] different layers.

In view of the foregoing, Applicants respectfully request that the Examiner's objection be withdrawn.

Sections 5-8

Claims 1-6 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Iyechika et al. (U.S. Patent 6,023,077); and claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iyechika et al. Applicants respectfully traverse the rejections.

Advantages of the Present Invention:

The inventive group III-V compound semiconductor of the general formula $In_xGa_yAl_zN$ is formed with the concentration of the p-type dopant in a range of 1×10^{7} cm^{-3} to 1×10^{21} cm^{-3}. By [illegible] p-type impurity [illegible] within this range, [illegible] the p-type [illegible] with high [illegible] [illegible] with a high [illegible] [illegible]. Thus, [illegible]

Experimental evidence of this fact can be seen in the examples and comparative examples of the present specification.

Iyechika et al.

Iyechika et al. teach a light emitting device having the atomic formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 < x < 1$, $0 < y < 1$, $0 < z < 1$). In order to find the present semiconductor unpatentable, the Examiner cites the disclosure at column 2, lines 44+; column 5, lines 17-19; and column 8, lines 1-14 of Iyechika et al.

However, upon careful review of the sections cited by the Examiner, Applicants could not find the teachings of Iyechika et al. which anticipate or make obvious the presently claimed semiconductor or light emitting device. The Examiner is respectfully requested to elaborate on his position in the next communication.

Applicants respectfully submit that it appears that this

[illegible] semiconductors, it appears that the Examiner has taken the position that the semiconductors prepared in the examples of Iyechika et al. *inherently* have a p type dopant concentration that falls within the inventive range of $1x10^{17}$ cm to $1 x 10^{18}$ cm^{-3}.

Applicants respectfully submit that the courts have not taken a similar position in similar cases. In *In re Pearson*, 181 USPQ 641 (CCPA 1974), the inherency issue involved a limitation of a composition used in a claimed process. The process inhibited the formation of small and malformed peanuts during the growth of peanut crops by applying a particular composition to the foliage of the crops. The composition contained a calcium-containing compound having a "sufficiently small particle size to substantially reduce the formation of pops and unsound kernels." The cited prior art taught a process that involved spreading an inorganic salt on the ground surrounding the peanut plant. The [illegible]

[illegible] the prior art. *See Ex parte Levy*, 17 USPQ2d 1461, 1462 (BPAI 1990); *see also In re Wilson*, 165 USPQ 494, 496 (CCPA 1970) ("[A] fact is known that inherency **must** flow as a necessary consequence from the prior art, not simply a possible one.

Since there is no teaching that the semiconductor of Iyechika et al. has a p-type dopant concentration that falls within the inventive range of $1x10^{17}cm^{-3}$ to $1 \times 10^{21}cm^{-3}$, Applicants respectfully submit that the rejection is not tenable. As such, Applicants respectfully request that the rejection be withdrawn.

Drawings

On June 13, 2002, Applicants amended the specification to include one sheet of drawings. However, the Examiner has not indicated whether this sheet of drawings is acceptable. The Examiner is respectfully requested to acknowledge whether this sheet of drawings is acceptable.

Notice of References Cited (PTO-892 Form)

[illegible] with the [illegible] this Action, Applicants [illegible] Examiner has [illegible] Action, [illegible]

Applicants respectfully request [illegible] lists Iyechika et al. Also, Applicants respectfully request that the Examiner clarifies why he has cited Sugimura et al. and Yamamura et al.

Information Disclosure Statements (IDS)

The Examiner is respectfully requested to forward initialed and signed copies of the PTO-1449 forms which were enclosed with the IDS filed September 12, 2002 **and** the IDS filed September 24, 2002.

Conclusion

In view of the above-amendments and comments, Applicants respectfully submit that the claims are in condition for allowance. A notice to such effect is earnestly solicited.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of three (3) months [illegible]

[illegible]

[illegible]

Payment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 and under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachments: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please amend the specification as follows:

Line 1 of page 1 has been amended as follows:

"BACKGROUNG OF THE INVENTION" -BACKGROUND OF THE INVENTION--.

Line 2 of page 1 has been amended as follows:

"Filed of the Invention" --Field of the Invention--.

The second paragraph beginning on page 12 and ending on page 13 has been amended as follows:

--For example, in this 3-5 group compound semiconductor, a light emitting layer, n-type layer, low carrier concentration layer and p type layer are adjacent in this order. For efficient recombination and light emission of injected charges, it is preferable that the [band] band gap of each layer is larger than that of the light emitting layer. The band gap of the low carrier concentration layer and light emitting layer is preferably 1.8 eV or more, more preferably 2.0 eV or more. The preferable thickness of each

A

film thickness of a low carrier concentration layer is lower than 10 A and when [...] than 1 nm. Further, the emission from the edge of a low carrier concentration layer is [...] A [...] and [...] less. The light emitting efficiency of a light emitting device may decrease both when the film thickness of a low carrier concentration layer is lower than 10 A and when [...] than 1 nm.--

IN THE CLAIMS:

The claims have been amended as follows:

Claim 2. (Amended) A 3-5 group compound semiconductor having a structure in which a [second] layer (B) composed of a 3-5 group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0 < u < 1$, $0 < v < 1$, $0 < w < 1$) is adjacent to a [first] layer (A) composed of a 3-5 group compound semiconductor represented by the general formula [illegible] ($x+y+z=1$, $0 < x < 1$, $0 < y < 1$, $0 < z < 1$) with the carrier concentration of [illegible] cm [illegible], wherein the carrier concentration of [illegible] cm [illegible], and the [illegible] layer is [illegible] than the [illegible] layer [illegible].

Claim 3. (Amended) A 3-5 group compound semiconductor having a structure in which a layer (A) composed of a 3-5 group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ (x+y+z=1, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is 1×10^{17} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{21} cm^{-3} or less is adjacent to a layer (C) composed of a p-type 3-5 group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ (a+b+c=1, $0 \leq a \leq 1$, $0 \leq b \leq 1$, $0 \leq c \leq 1$).

Claim 4. (Amended) A 3-5 group compound semiconductor having a structure comprising at least one layer (A) composed of a 3-5 group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ (x+y+z=1, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is 1×10^{17} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and [illegible] adjacent to a layer (C) composed of a p-type 3-5 group compound semiconductor represented by the general formula $In_aGa_bAl_cN$ (a+b+c=1, [illegible]

[illegible]

Claim 1. Amended] A [gallium nitride] multilayer [film] having a structure comprising a [second] layer (B) composed of a 3-5 group compound semiconductor represented by the general formula $In_uGa_vAl_wN$ ($u+v+w=1$, $0 \leq u \leq 1$, $0 \leq v \leq 1$, $0 \leq w \leq 1$) carrying thereon a laminated layer (D) composed of an n-type 3-5 group compound semiconductor represented by the general formula $In_pGa_qAl_rN$ ($p+q+r=1$, $0 \leq p < 1$, $0 < q \leq 1$, $0 \leq r < 1$) having larger band gap than that of said [second] layer (B), and at least one layer (A) composed of a 3-5 group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leq x < 1$, $0 < y \leq 1$, $0 \leq z < 1$) in which the concentration of an n-type carrier is 1×10^{17} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{17} cm^{-3} or more and 1×10^{20} cm^{-3} or less, between said layer (D) composed of the n-type 3-5 group compound semiconductor and a [third] layer (C)

[illegible]

[illegible]

[illegible]

Claim 6. (Amended) The [illegible] according to any one of claims 1 to [5] wherein the p-type dopant is Mg and/or Zn.

Claim 7. (Amended) A method of producing a 3-5 group compound semiconductor according to any one of claims 1 to [6] 5, comprising growing a 3-5 group compound semiconductor represented by the general formula $In_xGa_yAl_zN$ ($x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is 1×10^{18} cm^{-3} or less, wherein the concentration of a p-type dopant is 1×10^{19} cm^{-3} or more and 1×10^{21} cm^{-3} or less, at temperatures of 600 C or more and 950 C or less according to a metal organic vapor phase growth method.

Claim 8. (Amended) A light emitting device obtained by using a 3-5 group compound semiconductor according to any one of claims 1 to [7] 6.

Claim [illegible] deleted.